

JULY 2008
FINAL DRAFT

Maya Mountain Marine Corridor Conservation Action Strategy



Photo: Jan Meerman

Photo: Nancy Sefton

Core Team
Composition:



What's at stake

The Maya Mountain Marine Corridor

The Maya Mountain Marine Corridor (MMMC) consists of six watersheds in Southern Belize (Payne's Creek, Deep River, Golden Stream, Middle River, Rio Grande and Monkey River), as well as the Port Honduras Marine Reserve, which receives the waters directly discharged from these watersheds. The MMMC connects the Maya Mountains and the protected areas it contains with the coastal waters and reefs of the Gulf of Honduras. The MMMC encompasses approximately 729,650 acres on land and 100,000 acres at sea. The motivation for naming this area the Maya Mountain Marine Corridor was to encourage holistic "ridge to reef" conservation strategies in this expansive, interdependent and biologically significant area.

The biodiversity of the MMMC includes no less than 43 distinct ecosystems. These are categorized into seven broad ecosystem

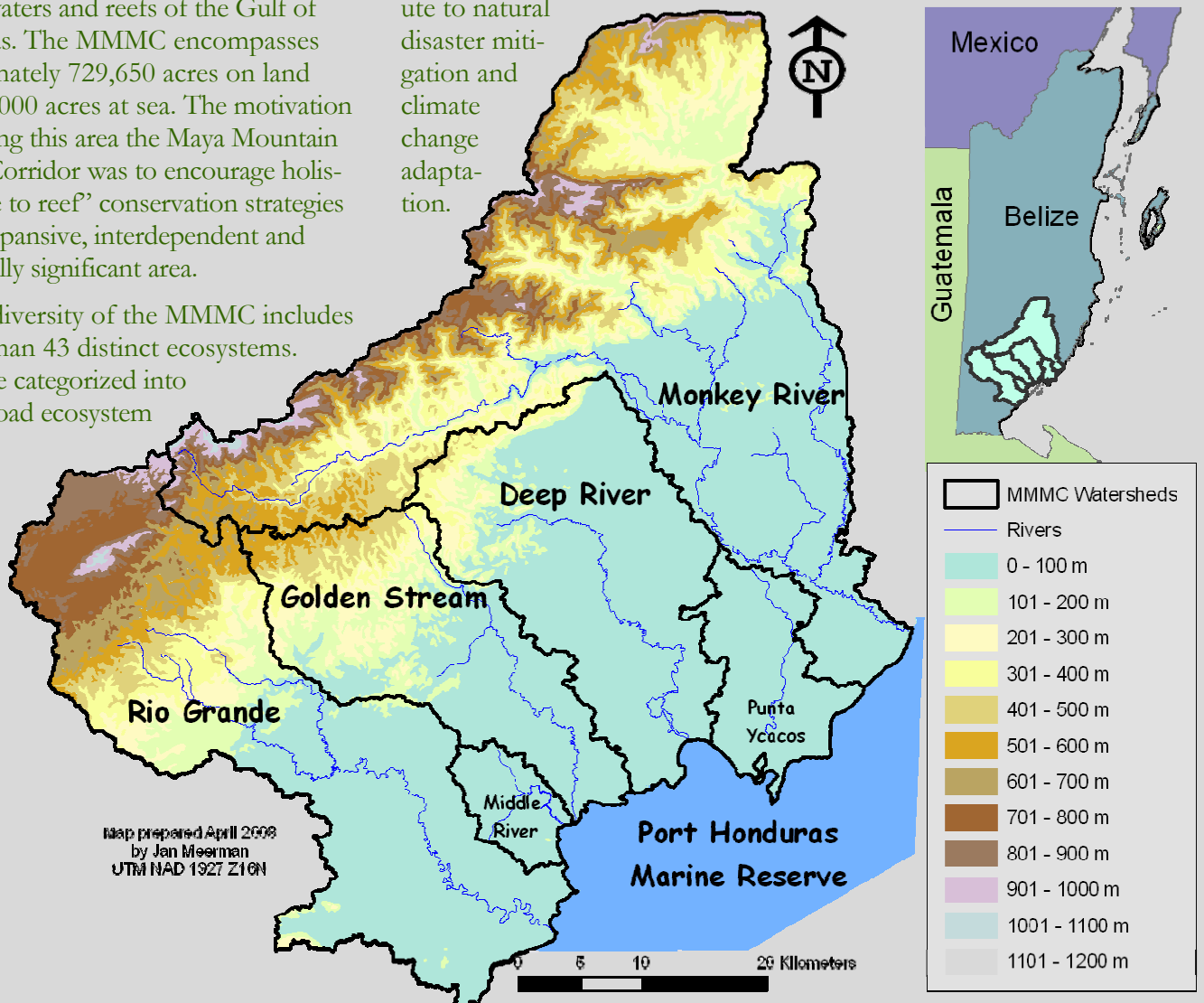
types: upland forests, coastal plain broad leaf forests, pine savannas, freshwater systems, near shore estuaries, seagrass beds, and coral reefs. These ecosystems support increasingly threatened species such as jaguar, marine turtles, manatee, and many endangered bird species such as the yellow-headed parrot. These ecosystems also help to fulfill human needs, while at the same time contribute to natural disaster mitigation and climate change adaptation.



Photo: Jan Meerman



Photo: TIDE



Who we work with

Our Partners

The MMMC was first conceptualized in the mid-1990s by the Belize Center for Environmental Studies and The Nature Conservancy (TNC), and later taken on by the Toledo Institute for Development and Environment (TIDE). In 2007-2008, TIDE, Ya'axché, TNC, and FFI co-sponsored a planning effort that culminated in the preparation of this Conservation Action Strategy for the MMMC .

In September 2007, the MMMC Conservation Action Planning (MMMC-CAP) partnership was formalized through the signing of a Process Charter. The Process Charter set out key objectives relating to the collaborative management of the MMMC and the safeguarding of the MMMC's interconnected and interdependent ecosystem functions from the ridge to the reef. This ecosystem management approach is consistent with the provisions of Belize's National Protected Areas System Plan, which has highlighted the Maya Mountains as one of three focal regions deserving special attention. Like the National Protected Areas System Plan, this MMMC Conservation Action Strategy is founded on the need to ensure that biodiversity conservation becomes an important and integral part of social and economic development.

This document serves as an overarching conservation strategy for the Maya Mountain Marine Corridor at a landscape level. It is envisaged that, using the Conservation Action Strategy as a guideline, management plans for the protected areas within the MMMC will

be produced or revised to ensure an integrated approach to conservation. Already, this MMMC Conservation Action Strategy has been instrumental in guiding the development of Belize's first landscape level Sustainable Development strategy for the Golden Stream Watershed, which is located at the center of the MMMC.



Photo: Jan Meerman

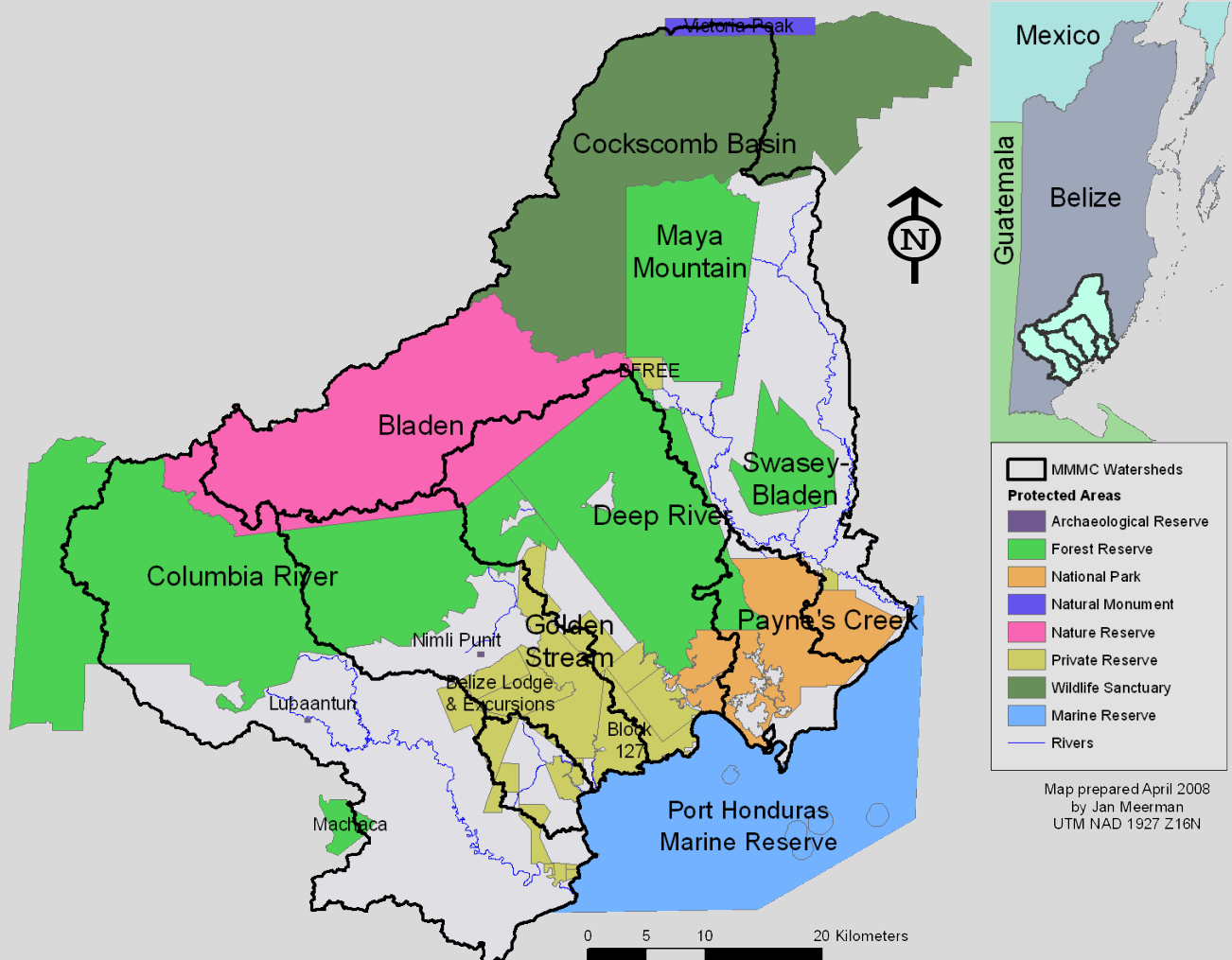
MMMC CAP Process Charter partners:
1. Toledo Institute for Development and Environment (TIDE)
2. The Nature Conservancy (TNC)
3. Forest Department
4. Fisheries Department
5. Ya'axché Conservation Trust
6. Fauna and Flora International (FFI)



Photo: TNC

Protected Areas in the MMMC

MMMC Protected Areas				
Protected Areas	Size	Ownership	Management Agency/Landowner	
Payne's Creek National Park	36,420 acres	Public	TIDE	NGO
Port Honduras Marine Reserve	100,000 acres	Public		
Block 127	9,231 acres	Private (Land Trust)		
TIDE private lands	1,772 acres	Private	Ya'axché	NGO
Golden Stream Corridor Preserve	15,038 acres	Private		
Boden Creek Ecological Preserve	8,000 acres	Private	Belize Lodge & Excursions	Private Company
Columbia River Forest Reserve (eastern block)	113,500 acres	Public	Forest Department	Government
Maya Mountain Forest Reserve	41,729 acres	Public		
Deep River Forest Reserve	67,304 acres	Public		
Swasey Bladen Forest Reserve	14,778 acres	Public		
Bladen Nature Reserve	99,673 acres	Public	Bladen Management Consortium	NGO Consortium
Nim Li Punit Archaeological Site	40 acres	Public	Institute of Archaeology	Quasi-governmental
Cockscomb Basin Wildlife Sanctuary (western portion)	122,260 acres	Public	Belize Audubon Society	NGO
John Spang Private Sanctuary	1,514 acres	Private	John Spang	Private Company



What we want to conserve

Conservation Targets

The majority of ecosystems, natural communities, and important species within the MMMC are contained within 8 ecological groupings and one cultural grouping that we are trying to conserve. These groupings were chosen because they represent and encompass the full array of environmental, social and economic features found in the MMMC. We call these our “conservation targets,” which are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. In theory, conservation of the focal targets will ensure the conservation of all native biodiversity within functional landscapes.

We did not select apparently obvious species as conservation targets – such as the Jaguar and Baird’s Tapir – because we aim to protect them by protecting their habitats. We made an assessment of viability for eight conservation targets, as shown in Appendix A.

Given the preponderance of archaeological sites within the MMMC, this was included as a focal cultural target requiring priority attention.

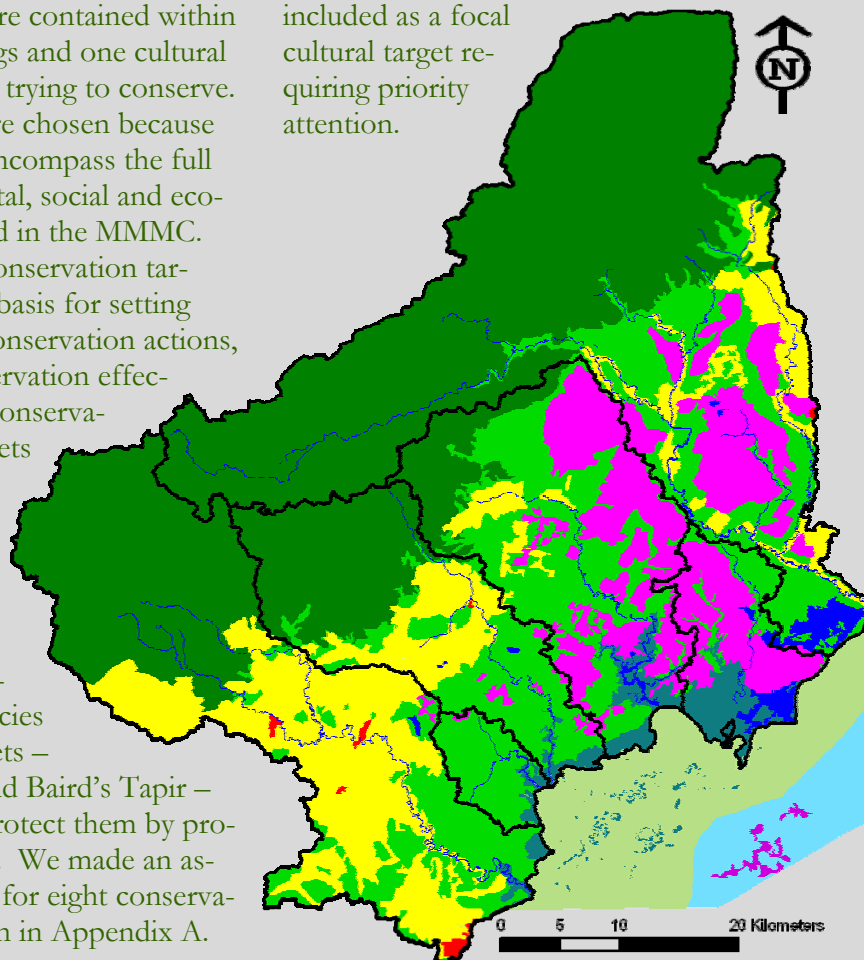
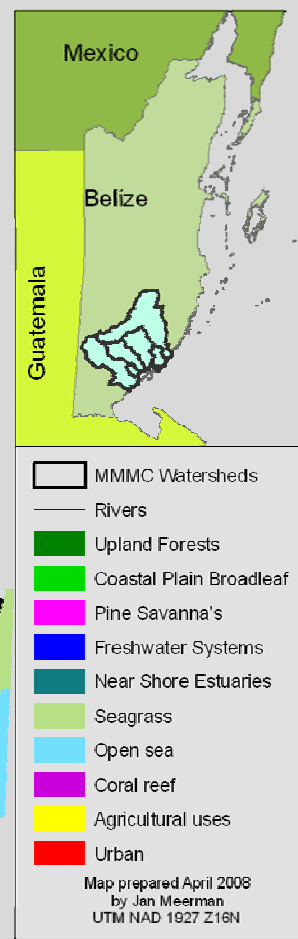


Photo: Jan Meerman



Conservation Targets	
Terrestrial Ecosystems	Freshwater Ecosystems
1. Upland Forests 2. Coastal Plain Broadleaf Forest 3. Pine Savanna	7. Freshwater Systems
	Species
	8. Large Marine Vertebrates
Marine Ecosystems	Cultural
4. Near Shore Estuaries 5. Seagrass Beds 6. Coral Reef Communities	9. Archaeological Sites



Photo: Jan Meerman

Critical threats to our conservation area

Critical Threats

All of the conservation targets are impacted by multiple threats, which act together to alter their viability.

Based on information from monitoring, expert opinion, and personal observations over the last decade, we ranked the main threats for each conservation target on the MMMC. Our highest ranking critical threats are:

1. **Hunting/Fishing pressure**
2. **Climate change – temperature**
3. **Agroindustries**
4. **Critically low reproductive population levels**
5. **Coastal development including dredging and land clearing**
6. **Habitat destruction from mangrove loss**
7. **Population increase and local migration**
8. **Destructive fishing practices**
9. **Diseases affecting coral reef communities**
10. **New and expanding human settlements**
11. **Pet trade (Yellow-headed Parrots)**
12. **Wildfires**
13. **Agrochemicals**
14. **Cattle ranching**

This suite of high ranking threats has direct impacts on the ecosystems of the MMMC. For example, wildfires not only change the character and species composition of forests, but they also initiate erosion and the leaching of nutrients thus affecting streams, rivers and ultimately



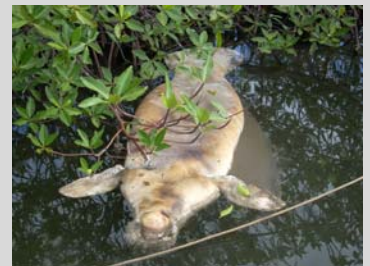
Forest fires - Photo: TIDE



Captured Marine Turtle - Photo: TIDE



Killed Ocelot - Photo: YA'AXCHÉ



Dead Manatee - Photo: TIDE



Gillnetting - Photo: TIDE

Our goals and objectives

Conservation Goals and Objectives

Our conservation goal for the Maya Mountain Marine Corridor is as follows:

The MMMC will continue to be a place of national importance to Belize and international importance to the greater Gulf of Honduras because of its environmental, economic and geopolitical significance.

In particular, we intend to maintain and/or improve the landscape context, condition, and size of native ecosystems by abating or eliminating their

most critical threats (see page 17 for definition of these terms).

To address the urgent and pervasive threats, we identified twelve threat-reduction objectives, and five restoration objectives.

The seventeen objectives below are the agreed upon focus of our work within the MMMC, and they will serve as the basis for measuring our success (see **Measures and Monitoring**). For ease of reference, we have divided the objectives into their various focal targets.



Photo: Jan Meerman

MMMC Conservation Goal:

The MMMC will continue to be a place of national importance to Belize and international importance to the greater Gulf of Honduras because of its economic, environmental and geopolitical significance.

TERRESTRIAL ECOSYSTEMS	
Upland Forests	
Objective 1	By 2013, reduce illegal hunting in the MMMC by 20% overall, and by 50% for white-lipped peccary
Objective 2	By 2018, reduce the number of jaguars killed in the MMMC as a result of human/animal conflict and hunting to less than one jaguar per year
Coastal Plain Broadleaf Forest	
Objective 3 (Restoration objective)	By 2017, increase the size of broadleaf forest within the coastal plain of the MMMC by 10% and restore connectivity among forest ecosystems in the MMMC by 20%
Pine Savannas	
Objective 4 (Restoration objective)	By 2020, the normal stand structure (species & age composition) for Caribbean Pine is re-established to conditions comparable to 50 years ago within the Pine Savannas of the MMMC
Objective 5	Eliminate anthropogenic wildland fires within the Pine Savannas of the MMMC by 2012
Objective 6	Eliminate the hunting of Yellow-headed Parrots within the Pine Savannas of the MMMC by 2012



Photo: Jan Meerman



Photo: Jan Meerman

Goals and Objectives (cont'd)

MARINE ECOSYSTEMS	
Near Shore Estuaries	
Objective 7	Prevent further degradation of littoral forests, mangroves and associated nursery zones
Coral Reef	
Objective 8	Reduce fishing pressure in the PHMR by 30% by eliminating illegal fishing and illegal fishing methods
Objective 9 (Restoration objective)	By 2018, increase commercial species (conch, lobster, snapper, grouper, parrotfish, shark) levels to viable population levels
FRESHWATER ECOSYSTEMS	
Freshwater Systems	
Objective 10 (Restoration objective)	Develop and implement a Hickatee recovery plan by 2009 and restore a viable breeding population by 2018
Objective 11 (Restoration objective)	Re-establish stable fish population in the MMMC rivers
Objective 12	Maintain barrier free longitudinal connectivity among MMMC drainages
Objective 13	Prevent further clearing of the legally established 66 ft setback along rivers and restore 20% of cleared setbacks by 2013.
Objective 14	Reduce the uses of pesticides by 25% every 5 years
SPECIES	
Large Marine Vertebrates	
Objective 15	By 2010, have nest monitoring and protection in place for 25% of all marine turtle nests
Objective 16	By 2015 increase large predatory fish populations in PHMR by 10% (for sharks) and 50% for Goliath Grouper.
CULTURAL	
Archaeological Sites	
Objective 17	By the year 2017, conserve 25% of the cultural sites of the MMMC through greater knowledge of sites, more effective management, and greater collaboration with other conservation partners



Photo: Nancy Sefton

MMMC Conservation Goal:

The MMMC will continue to be a place of national importance to Belize and international importance to the greater Gulf of Honduras because of its economic, environmental and geopolitical significance.



Photo: Jan Meerman



Photo: Julie Stockbridge

Our strategies

Conservation Strategies and Strategic Actions

We designed seven strategies to achieve our conservation objectives on the Maya Mountain Marine Corridor, all of which emphasize working with partners. Each conservation strategy directly addresses one critical threat and often indirectly addresses another (e.g., fire management would directly reduce the incidence of wildfires and at the same time indirectly protect Yellow-headed Parrot nesting habitat and contribute to suitable conditions for the regeneration of Caribbean Pine). Each conservation objective below is comprised of several strategic actions with varying time frames.

Strategy 1 – Reduction of Hunting & Fishing Pressures

Objective: *By 2013, reduce illegal hunting in the MMMC by 20% overall, and by 50% for white-lipped peccary*

Strategic Actions:

- Cross-sectoral collaboration/ dialogue on hunting issues
- Enforcement of existing hunting/ wildlife legislation (increase patrols)
- Increase protection status for game species (lobby for closed seasons)
- Develop and implement Public Awareness Campaigns on hunting issues
- Develop sustainable economic livelihood alternatives that complement poverty alleviation strategies

for the area

Objective: *By 2018, reduce the number of jaguars killed in the MMMC as a result of human/animal conflict and hunting to less than one jaguar per year*

Strategic Actions:

- Develop baseline data to determine the number of jaguars killed per year in the MMMC through collaborative efforts between partners
- Outreach to farmers and community members on ways to reduce jaguar-people conflicts

Objective: *Eliminate the hunting of Yellow-headed Parrots within the Pine Savannas of the MMMC by 2012*

Strategic Actions:

- Define ideal Yellow-headed Parrot population structure within the Pine Savannas of the MMMC
- Increase fines and penalties for the hunting of Yellow-headed Parrot, by influencing the Forest Department and Ministry of Natural Resources to revise and strengthen the wildlife laws and regulations
- Institute inter-agency coordination to support the Forest Department in the effective enforcement of wildlife laws and regulation
- Establish three viable income generating avi-tourism activities in the MMMC area



Photo: Jan Meerman



Photo: TIDE



Photo: TIDE

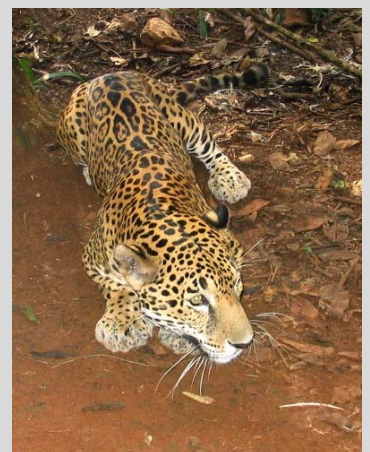


Photo: Jan Meerman

Conservation Strategies and Strategic Actions (cont'd)

Strategy 1 – Reduction of Hunting & Fishing Pressures (cont'd)

Objective: *By 2015, increase the Shark population by 10% based on 2008 levels, and the population of large (>110 cm) Goliath Grouper by 50%, in PHMR based on 2008 levels*

Strategic Actions:

- Define the shark and Goliath Grouper population in Port Honduras Marine Reserve (2008 levels)
- Develop public education/ awareness program for the marine reserve on the ecology of sharks and the Goliath Grouper
- Establish a national policy and legislation on sharks and the Goliath Grouper limiting catch by size and gear type, and species and finning (for sharks)
- Promote the enforcement of shark and Goliath Grouper legislation

Objective: *Reduce fishing pressure in the Port Honduras Marine Reserve by 30% by eliminating illegal fishing and illegal fishing methods*

Strategic Actions:

- Determine 2008 fishing levels (all users) in the PHMR
- Compulsory catch per unit area (CPUE) monitoring of all fishers within the PHMR
- Increase enforcement, vigilance, and coordination at all points of the fishing industry from extraction to commercialization
- Motivate stakeholders to support

legislation revision and Government to adopt them

- Sensitize the judicial system, as well as retailers (food industry) to impacts of illegal fishing within the MMMC
- Develop and institute alternative livelihoods programs for fishers

Objective: *Re-establish stable fish population in the rivers of the MMMC*

Strategic Actions:

- Establish status of fish assemblages throughout the freshwater system
- Prevent gillnet use in the rivers
- Promote best practices amongst fresh water fisher folks

Strategy 2 – Functional Connectivity among Ecosystems

Objective: *Prevent further degradation of littoral forests, mangroves and associated nursery zones*

Strategic Actions:

- Establish conservation easements as a means to protect key habitats on private lands
- Procure more littoral forest based on background research for crocodiles, turtles & birds
- Lobby the Forest Department to prohibit the allocation of permits for clearing of mangroves
- Develop a water quality baseline for the near shore estuaries
- Research the MMMC coastline for key areas with respect to migratory species, turtles, bird colonies and fish nurseries.



Photo: TIDE



Photo: TIDE



Photo: Nancy Sefton



Photo: TIDE

Conservation Strategies and Strategic Actions (cont'd)

Strategy 2 – Functional Connectivity among Ecosystems (cont'd)

Objective: *By 2017, increase the size of broadleaf forest within the coastal plain of the MMMC by 10% and restore connectivity among forest ecosystems in the MMMC by 20%*

Strategic Actions:

- Establish the extent of forest ecosystems fragmentation and determine the key areas for connectivity
- Determine the 2008 livestock ranching acreage in the coastal plain broadleaf forest within the MMMC
- Advocate revision of forest licenses to include forest regeneration activities
- Work with communities to establish community conservation areas in areas vulnerable to fragmentation, specifically geared to restoring or maintaining connectivity among forest ecosystems
- Develop and institute agroforestry programs practices for the benefit of restoring ecological connectivity
- Develop and provide incentives to land owners to maintain the forest and reforest unused land (for various ecological purposes)
- Develop sustainable economic livelihood alternatives that complement poverty alleviation strategies for the area
- Work GOB and ranchers to develop and implement Best Management Practices Guide for livestock

ranching to minimize environmental impacts

Objective: *Prevent further clearing of the legally established 66 ft setback along rivers and restore 20% of cleared setbacks by 2013*

Strategic Actions:

- Investigate importance of riparian buffers for birds and determine the most important areas and collaborate with stakeholders to protect these.
- Conduct research into ideal riverine buffer size in order to prevent direct spraying and leaching of pesticides into rivers
- Education and awareness campaign to create appreciation of riparian buffers
- Work with the public and private sector and local farmers to implement the (re-) establishment of the legally established riverine buffer
- Develop Indexes of Biological Integrity (IBI) and other biological/ecological parameters in order to be able to measure success.

Objective: *Maintain barrier free longitudinal connectivity among MMMC drainages*

Strategic Actions:

- Investigate importance of migratory component of river fauna
- Influence policy makers to restrict dams and similar barriers in the MMMC
- Interact with government and private sector on issues related to dams/obstructions/diversions

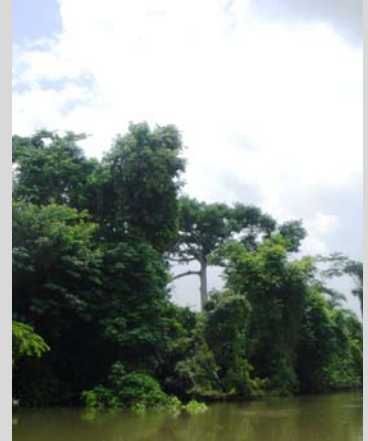


Photo: TIDE



Photo: YA'AXCHÉ



Photo: TIDE



Photo: YA'AXCHÉ

Conservation Strategies and Strategic Actions (cont'd)

Strategy 3 – Restoration of Species and Ecosystems

Objective: *By 2020, the normal stand structure (species & age composition) for Caribbean Pine is re-established to conditions comparable to 50 years ago within the Pine Savannas of the MMMC*

Strategic Actions:

- Institute sustainable forest management wherever there is resource use and extraction within the MMMC
- Develop and institute a monitoring and evaluation protocol for Caribbean Pine stand dynamics
- Carry out biodiversity assessments repeated every five years as a tool to monitor management effectiveness

Objective: *By 2018, increase commercial species (conch, lobster, snapper, grouper, parrotfish, shark) levels viable population levels*

Strategic Actions:

- Establish 2008 commercial species population levels
- Map key habitat (nursery, reproduction, feeding, etc.) for commercial species
- Increase the area of the no-take zone from 5% to 20% in the marine reserve
- Establish/revise size classes for commercial species (conch, lobster, snapper, grouper, parrotfish, sharks)

- Establishment of a monitoring mechanism for commercial species

Objective: *By 2010, have nest monitoring and protection in place for 25% of all marine turtle nests*

Strategic Actions:

- Map all nesting beaches indicating species, number of nests, reproductive success on an annual basis
- Research MMMC coastline for nursery habitat, marine turtle nesting and identify key areas
- Create viability figures for turtles and turtle nesting sites within the MMMC
- Physically protect marine turtle nests by means of excluders (such as covering with cages) and patrols

Objective: *Develop and implement a Hickatee recovery plan by 2009 and restore a viable breeding population in the Rio Grande by 2018*

Strategic Actions:

- Research the location of key habitats for the reproduction of the Hickatee
- Conduct study to establish current Hickatee population levels and dynamics
- Increase enforcement of laws and regulations as they pertain to the Hickatee
- Conduct community awareness campaign
- Research options for a Hickatee captive breeding program
- Develop and implement a Hickatee recovery plan based on population study



Photo: TIDE



Photo: TIDE



Photo: TIDE



Photo: TIDE

Conservation Strategies and Strategic Actions (cont'd)

Strategy 4 – Fire Management

Objective: Eliminate anthropogenic wildland fires within the Pine Savannas of the MMMC by 2012

Strategic Actions:

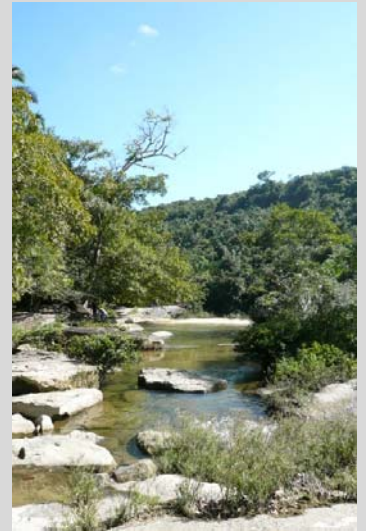
- Via the Fire Learning Network (FLN) planning process, develop and implement an integrated fire management plan
- Secure financial and technical support for the implementation of the integrated fire management plan
- Formalize and institute agreements among key resource management agencies and stakeholders (inter-agency coordination) for the efficient execution of the plan

Strategy 5 – Cultural Sites Conservation

Objective: By the year 2017, conserve 25% of the cultural sites of the MMMC through greater knowledge of sites, more effective management, and greater collaboration with other conservation partners

Strategic Actions:

- Develop a comprehensive list with mapping and assessment of all sites
- Increase the number of multi-year archaeological research projects
- Develop two more archaeological sites for tourism purposes with effective management plans in place
- Increase management presence at archaeological sites through collaboration with the Institute of Archaeology and other stakeholders



Caption describing picture or graphic.



Photo: TIDE



Photo: TIDE



Photo: TIDE



Photo: TIDE

Cross-cutting Strategies

We designed a cross-cutting strategy that focuses on pollution control and land use policy objectives within the Maya Mountain Marine Corridor. This strategy also emphasizes working with partners.

Strategy 6 – Pesticides Control

Objective: Reduce the uses of pesticides by 25% every 5 years

Strategic Actions:

- Collect water samples and start a water quality baseline recording pesticides
- Define specific pesticides to be targeted as a priority and whether reduction based on quantity sold is the most effective action

munities and community-based organizations in land resource planning and management in order that they may meaningfully participate in the proposed land use policy and planning process

- Conduct a series of participatory planning workshops between 2008-2009 to develop a land use policy and plan for the MMMC
- Develop and implement a Communications and Advocacy Strategy that will aim to promulgate and generate support for the draft land use policy/plan for subsequent Government of Belize endorsement
- Develop and provide incentives to land owners to maintain the ecological integrity of their land(s)

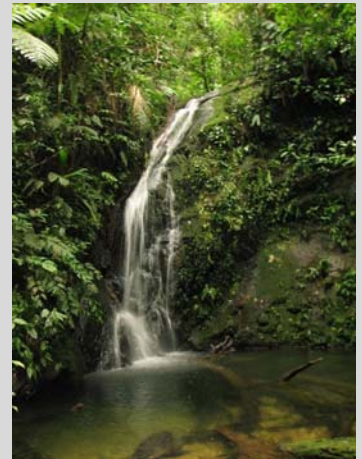


Photo: Jan Meerman



Photo: YA'AXCHÉ

Strategy 7 – Policy Development

Objective: With the effective participation of all stakeholders, by the year 2012, develop a land use policy and plan for the MMMC

Strategic Actions:

- Influence the Ministry of Natural Resources to appoint a Regional Land Advisory Council (representing all stakeholders) that would be charged with establishing guidelines for developing a land use policy and plan
- Secure financial and technical support to develop and promulgate the MMMC land use policy and plan
- Build the capacity of MMMC com-



Photo: TIDE

Measuring our success

Measures and Monitoring

The fundamental question facing any conservation project team is: “Are the conservation strategies we are using having their intended impact?” To answer this question, data will need to be collected on a number of indicators that gauge how well we are keeping the

critical threats in check and, in turn, whether the viability of our conservation targets is improving. At present, a monitoring framework for terrestrial, freshwater, and marine ecosystems has been developed (below). These indicators will be refined over time.



Photo: YA'AXCHÉ

Threat monitoring	Indicators
Hunting/fishing pressure	<ul style="list-style-type: none"> • Herds using coastal plains broadleaf forest (white-lipped peccary) • Number of arrests and patrols per year for illegal hunting of game species • # of fishers and time spent engaged in alternative livelihoods • Commercial Species density and size • Hickatee population structure
Pet trade	<ul style="list-style-type: none"> • Nesting success of Yellow-headed Parrots
Loss of habitat	<ul style="list-style-type: none"> • Number of jaguars per 100 sq km
Climate change	<ul style="list-style-type: none"> • Water temperature, sea water level change
Cattle ranching	<ul style="list-style-type: none"> • Total number and acreage of cattle farms
Agroindustries	<ul style="list-style-type: none"> • Percentage of mechanized agricultural land versus small scale farms
Agrochemicals	<ul style="list-style-type: none"> • Volume of agrochemicals sold • Water quality in streams and rivers
New and expanding human settlements	<ul style="list-style-type: none"> • Total acreage of forest as a percentage of potential forest cover
Up-downstream connectivity among communities & ecosystems	<ul style="list-style-type: none"> • Barriers to fish movement • Connectivity (% cover of thick buffer) of riparian zone and frequency of overbank flow
Coastal development including dredging and land clearing	<ul style="list-style-type: none"> • Rate of loss/increase of coastal mangroves • Total acreage of forest as a percentage of potential forest cover
Destructive fishing practices	<ul style="list-style-type: none"> • # incidences of illegal fishing gear per patrol
Wildfires	<ul style="list-style-type: none"> • Fire return intervals • Herbaceous layer species composition
Critically low reproductive population levels	<ul style="list-style-type: none"> • Population size monitoring of Hickatee, Sharks, Groupers



Photo: YA'AXCHÉ



Photo: YA'AXCHÉ



Photo: Jan Meerman

Measures and Monitoring (cont'd)

Viability/Integrity Monitoring	Indicators
Landscape context	
Condition of the forest	<ul style="list-style-type: none"> Miles of active non-commissioned trails (e.g., hunting and log-est)
Connectivity among forest ecosystems	<ul style="list-style-type: none"> Number and size of non-forest habitat fragmenting forest eco-
Timber species composition/dominance	<ul style="list-style-type: none"> Relative abundance of commercial hardwood species
Fish Species composition/dominance	<ul style="list-style-type: none"> Commercial Species density
Hydrologic regime (timing, duration, frequency, magnitude, extent)	<ul style="list-style-type: none"> Aquatic assemblage composition
Up-downstream connectivity among riparian communities & ecosystems	<ul style="list-style-type: none"> Barriers to fish movement Connectivity (% cover of thick buffer) of riparian zone and frequency of overbank flow
Coastal mangroves	<ul style="list-style-type: none"> Rate of loss/increase
Seagrass beds	<ul style="list-style-type: none"> Rate of loss/increase
Condition	
Trophic structure	<ul style="list-style-type: none"> Number of jaguars per 100 sq km
Presence/abundance of keystone forest species	<ul style="list-style-type: none"> Herds using coastal plain broadleaf forest (white-lipped pecary)
Forest population structure	<ul style="list-style-type: none"> Size/age class distribution
Fire regime - (timing, frequency, intensity, extent)	<ul style="list-style-type: none"> Fire return intervals
Savanna species composition/structure	<ul style="list-style-type: none"> Herbaceous layer species and abundance
Chemical Quality of streams	<ul style="list-style-type: none"> Chemistry: DO; Temp; TSS; Turbidity; N; P; POP's
Hickatee population viability	<ul style="list-style-type: none"> Presence & abundance
Macro-invertebrate communities	<ul style="list-style-type: none"> Richness of macro-invertebrate genera in riffles
Coral/Algal ratio	<ul style="list-style-type: none"> Live coral cover
Species composition/structure	<ul style="list-style-type: none"> Number of avifaunal species/year (diversity and abundance) Sea bird nesting colonies
Cultural sites condition and sacredness	<ul style="list-style-type: none"> Average % of structures looted per site Level of appreciation of sacred sites



Photo: TIDE



Photo: TIDE



Photo: TIDE



Photo: TIDE

Measures and Monitoring (cont'd)

Viability/Integrity Monitoring	Indicators
Condition (cont'd)	
Scientific knowledge of cultural sites	<ul style="list-style-type: none"> • Number and extent of scientific publications
Management presence	<ul style="list-style-type: none"> • Number of sites with permanent staff
Goliath Grouper population condition	<ul style="list-style-type: none"> • Population structure
Size	
Size of Broadleaf Forest	<ul style="list-style-type: none"> • Total acreage of forest as a percentage of potential forest cover
Size/extent of characteristic communities/ecosystems	<ul style="list-style-type: none"> • Area/acreage and or percentage
White-lipped Peccary population size & dynamics	<ul style="list-style-type: none"> • Number of White-lipped Peccary and reproduction
Manatees	<ul style="list-style-type: none"> • Population size
Marine Turtles	<ul style="list-style-type: none"> • Population size
Large (>110cm) Goliath grouper occurrence	<ul style="list-style-type: none"> • Size distribution of landed Goliath grouper



Photo: TIDE



Photo: TIDE



Photo: TIDE

Description of Landscape Context, Condition and Size		
LANDSCAPE CONTEXT	CONDITION	SIZE
An integrated measure of two factors: 1) the dominant environmental regimes and processes that establish and maintain the conservation target, and 2) connectivity.	An integrated measure of the composition, structure, and biotic interactions that characterize the conservation target.	Size is a measure of the area of the target, i.e., its geographic coverage. Minimum dynamic area, or the area needed to ensure survival or reestablishment after a natural disturbance, is another aspect of size.



Photo: Jan Meerman

Appendix A: Viability Assessment of Conservation Targets in the MMMC

Conservation Targets	Landscape Context	Condition	Size	Viability Rank
	Grade	Grade	Grade	
Upland Forests	Good	Fair	Fair	Fair
Coastal Plain Broadleaf Forests	Fair	Fair	Fair	Fair
Pine Savannas	Poor	Poor	-	Poor
Freshwater Systems	Good	Fair	-	Good
Near Shore Estuaries	Good	Fair	-	Fair
Seagrass Beds	Very Good	Very Good	Good	Very Good
Coral Reef Communities	Good	Poor	Poor	Fair
Large Marine Vertebrates	-	Poor	-	Poor
MMMC Biodiversity Health Rank				Fair



Photo: TNC



Photo: TIDE



Photo: TIDE



Photo: TIDE



Photo: TIDE

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MMMC-CAP Core Team meeting

Photo: TIDE

This document was produced via a Conservation Action Planning process, which is a powerful tool that guides conservation teams to develop focused strategies and measures of success. This planning process includes the following steps:

- *identify the project's biodiversity of interest and its current and desired status;*
- *identify the most critical threats currently or likely to degrade the biodiversity;*
- *develop strategies to abate the threats and maintain or restore the biodiversity based on the situation at hand; and,*
- *implement the strategies, monitor the outcomes and use that information to adapt and learn throughout the life of the project.*

The MMMC-CAP partners look forward to working in close partnership with all MMMC stakeholders to ensure the successful implementation of this Conservation Action Strategy for the Maya Mountains Marine Corridor.